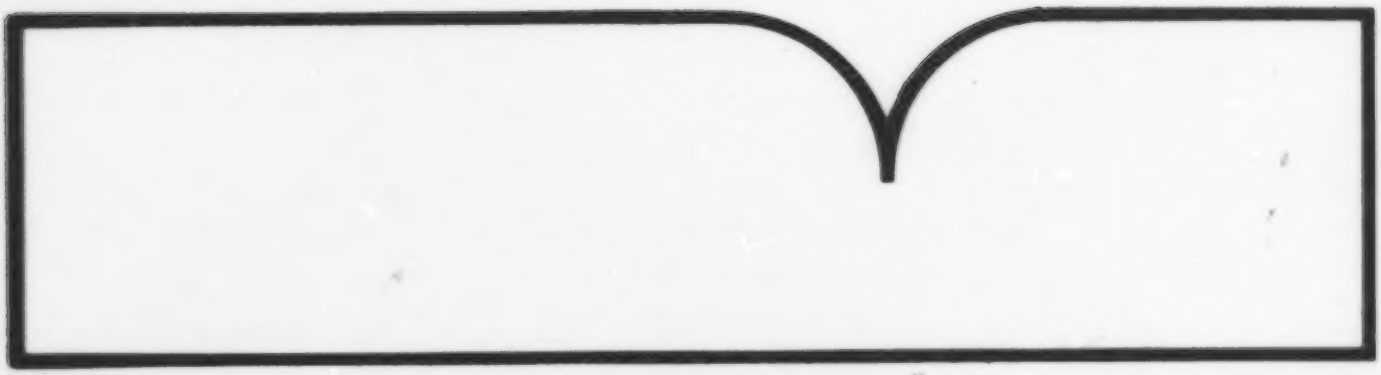
PB83-137414

Modifications to MOBILE2 Which Were Used by EPA to Response to Congressional Inquiries on the Clean Air Act

(U.S.) Environmental Protection Agency
Ann Arbor, MI

May 82



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16. ABSTRACT

This report contains the modifications to MOBILE2 (Mobile source emissions model) which were used by the Environmental Protection Agency to response to Congressional inquiries regarding the impacts of changes in motor vehicle emissions. The modifications represent EPA's revised estimates of emissions from certain vehicle classes, (ie, heavy-duty, light-duty...) under current statutory standards, as well as expected differences in administratively determined standards from those assumed in the orginal version of MOBILE2. ~~(EPA report 460/3-81-006).~~

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Modifications to MOBILE2 Which Were Used by EPA to Respond to Congressional Inquiries on the Clean Air Act

May 1982

Prepared by:

Emission Control Technology Division
Office of Mobile Source Air Pollution Control
Office of Air, Noise, and Radiation
U.S. Environmental Protection Agency

Table 1

Modified Emission Factors

Region[a]	Vehicle[b] Type Code	Pollutant[c] Code	First[d] Model Year	Last[d] Model Year	Modified Emission Factors	
					Zero Mile	Deterioration Rate
1	1	2	1981	1981	4.93	2.50
1	1	2	1982	1982	4.70	2.50
1	1	2	1983	2020	3.21	1.88
1	1	3	1983	2020	0.68	0.11
1	2	2	1984	2020	7.13	1.35
1	2	3	1985	1985	1.42	0.08
1	2	3	1986	2020	0.75	0.07
1	3	2	1984	2020	7.13	1.35
1	3	3	1985	1985	1.42	0.08
1	3	3	1986	2020	0.75	0.07
1	4	2	1979	1983	174.96	8.37
1	4	2	1984	1985	56.15	5.63
1	4	2	1986	2020	44.36	5.63
1	4	3	1984	1985	11.33	0.09
1	4	3	1986	2020	4.39	0.09
1	5	3	1983	1984	1.11	0.06
1	6	3	1985	1985	1.89	0.07
1	6	3	1986	2020	0.93	0.06
1	7	3	1985	1985	22.90	0.12
1	7	3	1986	2020	10.87	0.12

(a) 1 = Non-California Low Altitude
3 = Non-California High Altitude
(b) 1 = LDGV, 2 = LDGT1, 3 = LDGT2, 4 = HDGV, 5 = LDDV, 6 = LDDT, 7 = HDDV
(c) 2 = CO, 3 = NOx
(d) Only the last two digits of the model year are entered into MOBILE2.

PREFACE

The modifications in the document were used by EPA to respond to Congressional inquiries regarding the impacts of changes in motor vehicle emissions. The modifications represent EPA's revised estimates of emissions from certain vehicle classes under current statutory standards, as well as expected differences in administratively determined standards from those assumed in the original version of MOBILE2 which are listed below.

Assumed Emission Standards
Which Differ from MOBILE2 Assumptions

Altitude Region [a]	Vehicle Type	Pollutant	Model Years	Assumed Emission Standard	
Low	All LDT	NOx	1985	2.3	g/mi
			1986-2020	1.2 [b]	g/mi
	HDGV & HDDV	CO	1984-2020	35	g/bhp-hr
		NOx	1984-1985	10.7	g/bhp-hr
			1986-2020	4.0	g/bhp-hr
	LDDV	NOx	1983-1984	1.5	g/mi
High	All LDT	CO	1984-2020	14	g/mi
		NOx	1985	2.3	g/mi
			1986-2020	1.2 [b]	g/mi
	LDDV	NOx	1983-1984	1.5	g/mi

a: Non-California areas.
b: The mix of technology on LDTs expected under a 2.3 g/mi LDT NOx standard was assumed in calculating the CO emission factor for 1985 and later LDTs, however, EPA has in fact made an advance proposal for a 1.2 g/mi NOx standard to take effect in 1985 and the expected technology mix under a 1.2 g/mi NOx standard has been assumed in calculating the 1986 and later NO_x emission factor.

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3	Special I/M Credits Required to Maintain Consistency With Modified Emission Factors
4	Comparison of Original and Modified Composite Motor Vehicle Emission Factors as of December 31, 1987

Table 1, continued

Modified Emission Factors

Region[a]	Vehicle[b] Type Code	Pollutant[c] Code	First[d] Model Year	Last[d] Model Year	Modified Emission Factors	
					Zero Mile	Deterioration Rate
3	1	2	1981	1981	10.78	3.07
3	1	2	1982	1982	8.13	3.12
3	1	2	1983	1983	7.75	3.12
3	1	2	1984	2020	3.75	2.24
3	1	3	1981	1981	0.52	0.09
3	1	3	1982	1983	0.57	0.10
3	1	3	1984	2020	0.58	0.10
3	2	2	1984	2020	9.85	1.35
3	2	3	1984	1985	1.26	0.04
3	2	3	1986	2020	0.69	0.07
3	3	2	1984	2020	9.85	1.35
3	3	3	1984	1985	1.26	0.04
3	3	3	1986	2020	0.69	0.07
3	4	2	1979	1983	324.55	8.37
3	4	2	1984	1985	104.16	5.63
3	4	2	1986	2020	82.29	5.63
3	4	3	1984	1985	7.55	0.09
3	4	3	1986	2020	2.92	0.09
3	5	3	1983	1984	1.11	0.06
3	6	2	1984	2020	2.77	0.09
3	6	3	1985	1985	1.89	0.07
3	6	3	1986	2020	0.93	0.06
3	7	3	1985	1985	22.90	0.12
3	7	3	1986	2020	10.87	0.12

(a) 1 = Non-California Low Altitude
3 = Non-California High Altitude
(b) 1 = LDGV, 2 = LDGT1, 3 = LDGT2, 4 = HDGV, 5 = LDDV, 6 = LDDT, 7 = HDDV
(c) 1 = HC, 2 = CO, 3 = NOx
(d) Only the last two digits of the model year are entered into MOBILE2.

Table 2

Internal Modifications Required to MOBILE2 to Maintain Consistency With Modified Emission Factors

The internal modifications listed in the following table are required to maintain consistency with the modified emission factors. Without these modifications, incorrect results will be calculated for all MOBILE2 runs involving high altitude CO emission factors, an I/M program that inspects light-duty trucks, temperatures outside the range of 68°F to 86°F, or nonstandard operating mode parameters (standard parameters are PCCN = 20.6, PCHC = 27.3, and PCCC = 20.6).

With these modifications, consistent CO and NOx emission factors will be calculated. However, the HC output from MOBILE2 with these modifications will not be meaningful and should not be used. The original MOBILE2, or MOBILE1, should continue to be used for calculating all HC emission factors.

Table 2, Continued
Internal Modifications Required to
MOBILE2 to Maintain Consistency
With Modified Emission Factors

LINE NUMBER	ORIGINAL MOBILE2 SOURCE	LINE NUMBER	MODIFIED MOBILE2 SOURCE
SUBPROGRAM PCLEFI			
40084	IF(MY .GE. 1975 AND MY .LE. 1984) ITECH=2	40084	IF(MY .GE. 1975 AND MY .LE. 1985) ITECH=2
40088	IF(MY .GE. 1979 AND MY .LE. 1984) ITECH=2	40088	IF(MY .GE. 1979 AND MY .LE. 1985) ITECH=2
40089	300 IF(MY .GT. 1984) ITECH=4	40089	300 IF(MY .GT. 1985) ITECH=4
SUBPROGRAM BLOCK DATA 3			
55375	* 1983,1984,0000,0000,0000,	55375	* 1983,0000,0000,0000,0000,
55377	* 1983,2020,0000,0000,0000,	55377	* 1983,0000,0000,0000,0000,
55393	* 1983,1984,1985,0000,0000,	55393	* 1983,1984,0000,0000,0000,
55395	* 1983,1984,2020,0000,0000,	55395	* 1983,1984,0000,0000,0000,
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68061	* 1967,1972,1974,1978,1980,1984,2020,0000,0000/	68061	* 1967,1972,1974,1978,1980,1985,2020,0000,0000/
68067	* 1969,1973,1978,1980,1984,2020,0000,0000,0000,	68067	* 1969,1973,1978,1980,1985,2020,0000,0000,0000,
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68106	* 1974,1976,1977,1978,1979,1980,1982,2020,0000/	68106	* 1974,1976,1977,1978,1979,1980,1984,2020,0000/
68113	* 1978,1979,1984,2020,0000,0000,0000,0000,0000,	68113	* 1978,1979,1985,2020,0000,0000,0000,0000,0000,
68121	* 1978,1979,1984,2020,0000,0000,0000,0000,0000/	68121	* 1978,1979,1985,2020,0000,0000,0000,0000,0000/

Table 3

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

Explanation

Low Altitude Areas - The I/M credits for CO emissions from Technology 4 vehicles appearing in the original MOBILE2 are not compatible with the alternate emission factors given in Table 1. New compatible CO credits have been generated and appear below and in the accompanying low-altitude punched card deck.

High Altitude Areas - The affected EPA Regional Offices were notified on August 4, 1981 (C. Gray to Air and Hazardous Materials Division Directors, Regions 8-10, copy subsequently sent to Region 6) of the availability of a complete set of alternate I/M credits for high-altitude areas, covering Technology 1 through 4 vehicles. The Technology 4 credits for CO in that set of credits are not compatible with the alternate emission factors given in Table 1. A new complete and compatible set of credits appear below and in the accompanying high-altitude punched card deck.

Additional card decks can be requested by calling (313)668-4235 or FTS 374-8235.

Instructions for Use

Low Altitude Areas - The punched card deck (including the first card which contains the number "9" and the following title cards) must be supplied to MOBILE2 during execution on I/O Unit 4. In addition, the input record describing the I/M program parameters (see Users Manual Section 2.2.4 on page 26) must have all eight parameters specified, with the eighth -- the new data flag -- having a value of "2" to indicate that only Technology 4 I/M credits will be altered. The HC output from MOBILE2 with these modifications and new I/M credits should be ignored, and the HC output from the original MOBILE2, or MOBILE1, used instead.

High Altitude Areas - Instructions for use are the same as for low-altitude areas, except that the new data flag should have a value of "3" to indicate that all I/M credits will be altered.

Table 3, Continued

Special I/M Credits Required to Maintain Consistency With Modified Emission Factors

(Page 1 of 2 containing low-altitude I/M credits)

```
9
**********************************************************
**  SPECIAL LOW-ALTITUDE CO I/M CREDITS FOR TECH 4      **
**  VEHICLES TO MAINTAIN CONSISTENCY WITH MODIFIED      **
**  EMISSION FACTORS FOR LOW-ALTITUDE VEHICLES          **
**  RELEASED IN APRIL 1982.  THESE CREDITS ARE VALID    **
**  ONLY FOR LOW-ALTITUDE REGIONS.                      **
** >>IGNORE ALL HC OUTPUT WHEN USING THESE CREDITS.<<   **
**      >> CALL (313) 668-4365 FOR ASSISTANCE <<        **
**********************************************************
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 0  0  0  0  0  0  0  0  0  0 38 38 38 38 38 38 38 37
```

Table 3, Continued

Special I/M Credits Required to Maintain Consistency With Modified Emission Factors

(Page 2 of 2 containing low-altitude I/M credits)

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors
(Page 1 of 9 containing high-altitude I/M credits)

```
9
**********************************************************
**  SPECIAL HIGH-ALTITUDE CO I/M CREDITS FOR TECH      **
**  1, 2 & 4 VEHICLES TO MAINTAIN CONSISTENCY WITH    **
**  MODIFIED EMISSION FACTORS FOR HIGH-ALTITUDE       **
**  VEHICLES RELEASED APRIL 1982.  THESE CREDITS ARE  **
** >>IGNORE ALL HC OUTPUT WHEN USING THESE CREDITS.<< **
**       >>CALL (313) 668-4365 FOR ASSISTANCE<<       **
**********************************************************
 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
```

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 2 of 9 containing high-altitude I/M credits)

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 3 of 9 containing high-altitude I/M credits)

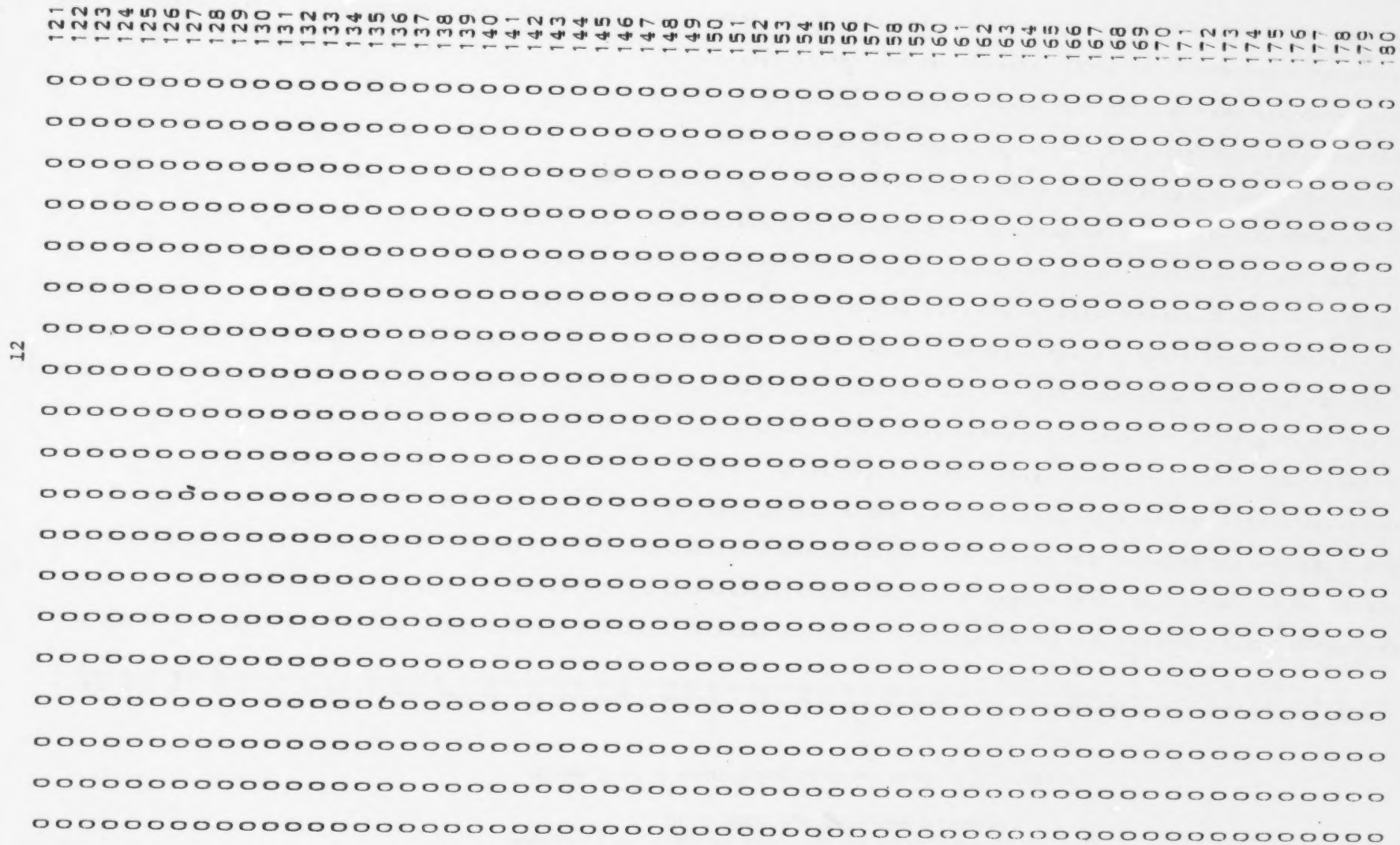

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 4 of 9 containing high-altitude I/M credits)

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 5 of 9 containing high-altitude I/M credits)

08	08	09	10	11	12	13	14	14	18	17	16	15	14	13	11	10	09	09	241
08	09	09	10	11	12	13	14	19	17	17	16	14	13	12	11	10	09	09	242
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13	12	13	14	17	19	21	22	24	25	26	27	24	22	21	20	18	17	16	278
13	13	13	15	18	20	22	23	24	26	27	25	24	22	20	19	18	16	16	279
14	14	14	16	18	20	22	23	24	26	26	25	23	21	20	18	17	16	16	280
14	14	15	17	18	20	22	23	25	27	26	24	23	21	19	17	16	15	15	281
15	15	16	17	19	21	22	23	28	27	25	24	22	20	19	16	15	14	15	281
15	15	17	18	19	21	23	29	28	27	25	24	22	20	18	16	14	13	14	282
15	16	18	19	20	21	29	28	27	26	25	23	21	19	17	15	13	12	14	284
16	17	18	19	20	30	29	28	27	25	24	22	20	18	16	14	12	11	13	285
16	17	19	20	31	30	29	27	26	25	23	22	20	18	15	13	11	11	12	286
16	18	19	31	31	29	28	27	26	24	23	21	19	17	14	12	10	10	12	287
16	18	32	31	30	29	28	27	25	24	22	20	18	16	13	11	09	08	11	288
17	32	32	31	30	29	27	26	25	23	21	19	17	15	12	10	08	08	10	289
33	32	31	30	29	28	26	25	24	22	20	18	15	12	10	08	07	09	03	290
04	11	09	11	13	16	18	20	22	24	25	26	27	28	30	31	32	33	34	291
12	10	10	13	15	18	20	22	23	25	26	27	28	29	31	32	33	33	22	292
13	11	12	14	17	19	21	22	24	25	27	28	28	30	31	32	33	26	21	293
14	12	13	16	18	20	22	23	25	26	27	28	29	30	31	32	27	25	21	294
14	13	15	17	19	21	22	24	25	27	28	29	30	31	32	27	26	24	21	295
15	15	16	18	20	22	23	25	26	27	29	30	30	31	28	27	25	24	20	296
16	16	18	20	21	23	24	25	27	28	29	30	31	29	28	27	25	23	20	297
17	18	20	21	22	24	25	26	28	29	30	31	29	28	27	26	24	22	20	298
17	19	21	23	24	25	27	28	29	30	31	30	29	28	26	25	23	22	19	299
18	20	22	24	25	26	27	28	29	30	30	29	28	27	26	24	23	21	18	300

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 6 of 9 containing high-altitude I/M credits)

18	21	23	24	26	27	28	29	30	30	29	28	27	26	25	24	22	20	18	301
19	22	23	25	26	28	29	30	31	30	29	28	27	25	24	23	21	19	17	302
20	22	24	26	27	28	29	31	30	29	28	26	25	24	22	21	20	18	17	303
20	23	25	27	28	29	31	30	29	28	27	25	24	23	21	20	18	16	16	304
20	24	25	27	28	31	30	30	29	27	26	25	23	22	20	18	16	15	15	305
21	24	26	27	32	31	30	29	28	27	25	24	22	21	19	17	15	13	14	306
21	25	27	32	31	30	29	28	27	26	25	23	22	20	18	16	13	12	14	307
21	26	33	32	31	30	28	28	27	25	24	22	21	19	17	14	12	11	13	308
22	33	33	32	31	29	28	27	26	25	23	22	20	18	15	13	10	10	12	309
34	33	32	31	30	28	27	26	25	24	22	20	18	16	13	11	09	11	04	310
02	08	12	15	17	20	21	22	23	24	25	25	25	26	27	28	28	29	30	311
06	11	14	16	18	20	22	23	24	24	24	25	25	26	27	27	28	29	05	312
05	09	11	13	15	16	19	20	22	23	23	23	24	24	25	25	25	08	05	313
05	08	10	11	13	14	15	16	18	19	20	21	23	23	24	24	10	09	05	314
04	07	09	11	12	13	14	15	16	17	18	19	20	21	21	12	11	10	07	315
04	07	09	10	12	13	14	15	16	16	17	18	19	20	13	12	11	10	06	316
03	06	08	09	11	12	13	14	15	16	17	18	19	14	13	12	10	09	05	317
02	05	07	09	10	12	13	14	15	16	17	17	15	14	13	12	11	10	07	318
03	05	07	09	10	11	13	14	15	15	16	16	15	14	13	12	11	10	06	319
02	05	07	09	10	11	12	13	14	15	17	16	15	15	14	13	13	11	07	320
02	05	07	08	09	10	11	11	11	19	18	18	18	16	16	15	13	11	07	321
01	04	06	07	07	08	08	08	23	22	21	20	19	18	17	15	13	11	07	322
02	04	06	06	06	07	07	26	24	23	22	21	20	18	17	15	13	10	07	323
00	03	05	05	06	06	27	26	25	23	22	21	20	19	17	16	14	11	07	324
00	03	05	05	06	28	27	26	24	23	22	21	20	19	18	16	14	11	08	325
01	04	05	05	30	29	28	27	26	24	23	22	21	19	18	16	14	12	08	326
00	03	03	32	31	31	30	28	27	26	25	23	22	20	19	17	15	13	09	327
00	03	34	34	34	33	32	31	31	29	28	26	24	22	20	19	17	13	09	328
00	37	36	35	35	34	34	33	32	31	31	29	28	26	24	21	19	16	10	329
37	37	36	35	34	34	33	33	32	31	31	30	28	26	23	21	17	12	03	330
04	15	20	23	26	27	27	28	28	29	29	30	31	31	32	32	33	33	34	331
13	19	23	25	27	27	28	28	29	29	30	30	31	32	32	33	33	34	11	332
11	18	21	24	26	27	28	28	28	29	29	30	30	31	32	32	33	15	11	333
10	16	19	22	24	26	27	28	28	28	29	29	30	30	31	31	19	15	11	334
09	14	17	20	22	24	25	26	27	27	27	28	28	29	29	21	19	16	11	335
08	13	16	19	20	22	23	24	25	26	27	27	28	28	23	21	19	16	11	336
08	13	16	18	20	21	22	23	24	25	26	27	28	25	23	21	19	16	11	337
07	12	15	17	19	20	22	23	24	25	26	27	26	25	23	21	19	16	11	338
06	11	14	17	18	20	21	22	23	24	25	28	26	25	23	22	19	16	12	339
06	11	14	16	18	19	20	21	22	23	28	27	26	25	23	21	19	16	12	340
06	10	13	15	17	18	19	20	21	29	28	27	26	25	23	21	19	16	12	341
06	10	13	15	17	18	20	21	30	29	28	27	26	25	23	22	20	17	12	342
05	09	12	14	16	18	19	32	31	30	29	28	27	26	25	23	21	17	12	343
05	09	12	14	16	18	34	33	32	31	30	29	28	27	25	24	22	18	13	344
05	09	12	14	16	35	34	34	33	32	31	30	29	27	26	24	22	19	13	345
05	08	11	14	36	35	35	34	34	33	32	31	30	28	27	25	23	19	13	346
04	08	12	37	37	36	35	35	34	33	32	32	31	30	28	26	24	20	14	347
04	08	39	39	38	37	36	36	35	34	34	33	33	32	31	29	26	22	15	348
04	39	39	38	37	37	36	36	35	35	34	33	33	33	32	30	28	23	16	349
39	38	38	37	37	36	36	35	35	34	34	33	33	32	31	29	25	19	05	350
05	21	27	29	30	31	31	32	32	33	33	33	33	34	34	34	35	35	36	351
18	26	28	30	31	31	31	32	33	33	33	34	34	34	35	35	35	36	15	352
17	24	27	29	30	31	31	32	32	33	34	34	35	35	36	36	37	23	15	353
15	23	27	29	30	31	31	31	32	33	33	34	34	35	35	36	27	23	15	354
14	22	26	28	29	30	31	31	32	32	32	33	34	34	35	30	27	23	15	355
13	21	25	28	30	31	32	32	33	33	33	33	34	34	32	30	27	23	16	356
13	21	25	28	30	31	32	33	34	34	34	35	35	34	32	30	27	23	16	357
12	21	25	28	30	31	32	33	34	35	35	36	35	33	32	30	27	23	16	358
12	20	25	27	28	30	31	32	32	33	34	36	35	33	32	30	27	23	16	359
12	20	24	26	28	29	30	31	32	33	36	35	34	33	32	30	27	24	16	360

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 7 of 9 containing high-altitude I/M credits)

11	20	24	26	27	28	29	31	32	37	36	35	34	33	31	30	27	24	16	361
11	19	23	25	27	28	30	31	38	37	36	35	34	33	32	30	28	25	16	362
11	19	22	25	27	29	30	39	38	38	37	36	35	34	33	31	29	25	16	363
11	18	22	25	27	29	39	39	38	38	38	37	36	35	34	32	30	25	16	364
10	18	22	25	27	39	38	38	38	37	37	37	36	35	34	32	29	25	17	365
10	17	22	25	39	38	37	37	36	36	35	35	35	34	33	32	29	25	17	366
10	17	22	40	39	39	38	37	37	36	35	35	34	34	33	32	30	26	18	367
10	17	40	40	39	38	38	37	37	36	36	35	34	34	33	32	30	27	20	368
10	39	38	38	37	37	37	36	36	36	36	35	34	34	33	33	31	28	21	369
38	38	37	37	37	36	36	36	36	36	35	34	34	34	33	32	30	23	06	370
06	24	30	32	33	33	33	34	34	34	34	35	35	35	36	36	37	37	37	371
22	29	32	33	33	33	34	34	34	35	35	35	36	36	36	37	37	38	17	372
20	28	32	33	33	33	34	34	35	35	36	36	36	37	38	38	39	27	17	373
18	27	31	32	33	33	34	34	35	35	36	37	37	38	38	39	33	27	17	374
17	26	30	32	33	33	34	34	35	36	36	37	38	38	39	37	33	27	17	375
16	25	30	32	33	33	34	34	35	35	36	37	37	38	39	36	33	27	17	376
16	25	29	32	33	34	34	35	35	36	37	37	38	40	39	36	32	27	17	377
15	25	30	32	34	35	36	37	37	37	38	39	41	40	38	36	33	28	17	378
15	24	30	33	35	36	37	38	38	39	39	42	41	39	38	36	32	27	17	379
14	24	30	33	34	36	37	38	38	39	42	41	40	39	37	35	32	27	17	380
14	24	30	32	34	36	37	38	39	42	41	40	39	38	37	35	32	27	17	381
14	25	30	33	35	37	38	39	42	41	41	40	39	38	37	35	32	27	17	382
14	25	30	33	35	37	38	41	40	39	39	39	38	38	36	35	32	27	17	383
14	24	29	33	35	37	40	39	39	38	37	37	37	37	36	34	32	27	18	384
14	24	29	33	36	40	39	39	38	37	37	36	36	35	35	34	32	28	18	385
14	24	30	33	41	40	39	39	38	37	37	36	36	35	35	34	32	28	19	386
14	23	30	41	40	39	39	38	38	37	37	36	36	35	35	34	32	29	19	387
14	24	40	39	39	38	37	37	37	36	36	35	35	35	34	34	33	29	21	388
13	38	38	38	37	37	36	36	36	35	35	35	34	34	34	34	33	30	22	389
38	38	37	37	36	36	36	35	35	35	34	34	34	34	34	33	31	25	07	390
07	24	30	31	32	32	33	33	33	33	34	34	35	35	36	36	36	36	36	391
22	29	31	32	32	33	33	33	34	34	34	35	35	36	36	37	37	37	16	392
20	29	32	33	33	34	34	35	35	35	36	36	37	37	38	38	39	29	16	393
19	29	33	34	35	35	35	36	36	37	37	37	38	38	39	39	35	28	16	394
18	29	33	34	35	35	36	36	36	37	37	38	38	39	39	38	35	28	16	395
18	29	33	34	35	35	36	36	37	37	38	38	39	40	42	39	35	29	16	396
17	28	32	34	35	35	36	36	37	38	38	39	39	43	41	39	35	29	16	397
17	28	32	34	35	36	37	37	38	38	39	40	43	42	41	38	35	29	16	398
17	28	33	35	36	37	38	38	39	39	40	43	42	41	40	38	34	29	17	399
17	28	33	36	37	38	39	39	40	41	41	41	40	39	39	37	34	28	17	400
17	28	34	37	39	39	40	41	41	41	40	39	39	38	37	36	33	28	17	401
17	29	34	38	40	41	42	43	40	39	39	38	38	37	36	35	33	28	17	402
16	29	35	38	41	42	43	40	39	38	38	37	37	36	35	34	32	28	17	403
16	29	35	39	41	43	39	39	38	38	37	36	36	35	35	34	32	28	17	404
16	29	35	39	42	40	39	38	38	37	37	36	36	35	35	34	33	29	18	405
16	28	35	38	39	39	38	38	37	37	36	36	36	35	35	34	33	29	18	406
16	28	35	39	39	38	38	37	37	37	36	36	35	35	35	34	33	29	19	407
16	29	39	38	38	37	37	36	36	35	35	35	34	34	33	33	32	29	20	408
16	37	37	37	36	36	35	35	34	34	34	33	33	33	32	32	31	29	22	409
36	36	36	36	36	35	35	34	34	33	33	33	33	32	32	31	30	24	07	410
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	411
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	412
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	34	413
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	34	34	414
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	34	34	33	415
0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33	33	33	33	416
0	0	0	0	0	0	0	0	0	0	0	0	0	33	33	33	33	33	33	417
0	0	0	0	0	0	0	0	0	0	0	0	33	33	33	33	33	33	33	418
0	0	0	0	0	0	0	0	0	0	0	33	33	33	33	33	33	33	33	419
0	0	0	0	0	0	0	0	0	0	33	33	33	33	33	33	33	32	32	420

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 8 of 9 containing high-altitude I/M credits)

Table 3, Continued

Special I/M Credits Required to Maintain Consistency
With Modified Emission Factors

(Page 9 of 9 containing high-altitude I/M credits)

0	0	0	0	0	0	0	0	0	48	47	47	47	47	47	47	47	47	46	481
0	0	0	0	0	0	0	0	47	47	47	47	47	47	47	47	46	46	46	482
0	0	0	0	0	0	0	47	47	47	47	47	47	47	47	46	46	46	46	483
0	0	0	0	0	0	47	47	47	47	47	47	47	46	46	46	46	45	45	484
0	0	0	0	0	47	47	47	47	47	47	47	46	46	46	46	45	45	44	485
0	0	0	0	47	47	47	47	47	47	47	46	46	46	46	45	45	44	43	486
0	0	0	47	47	47	47	47	47	46	46	46	46	46	45	45	44	43	42	487
0	0	47	47	47	47	47	47	46	46	46	46	45	45	45	44	43	42	40	488
0	47	47	47	47	47	47	46	46	46	46	45	45	45	44	43	42	40	37	489
47	47	47	47	47	47	46	46	46	46	45	45	45	44	43	42	40	37	12	490
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	491
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	492
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	53	493
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	53	53	494
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	53	53	53	495
0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	53	53	52	52	496
0	0	0	0	0	0	0	0	0	0	0	0	0	53	53	53	52	52	52	497
0	0	0	0	0	0	0	0	0	0	0	0	53	53	52	52	52	52	52	498
0	0	0	0	0	0	0	0	0	0	0	53	53	52	52	52	52	52	52	499
0	0	0	0	0	0	0	0	0	0	53	53	52	52	52	52	52	52	51	500
0	0	0	0	0	0	0	0	0	53	52	52	52	52	52	52	52	51	51	501
0	0	0	0	0	0	0	0	53	52	52	52	52	52	52	52	51	51	51	502
0	0	0	0	0	0	0	52	52	52	52	52	52	52	52	51	51	51	50	503
0	0	0	0	0	0	52	52	52	52	52	52	52	51	51	51	51	50	50	504
0	0	0	0	0	52	52	52	52	52	52	52	51	51	51	51	50	50	49	505
0	0	0	0	52	52	52	52	52	52	52	51	51	51	51	50	50	49	48	506
0	0	0	52	52	52	52	52	52	52	51	51	51	50	50	50	49	48	47	507
0	0	52	52	52	52	52	52	52	51	51	51	50	50	50	49	48	47	45	508
0	52	52	52	52	52	52	52	51	51	51	50	50	50	49	48	47	45	42	509
52	52	52	52	52	52	52	51	51	51	50	50	50	49	48	47	45	41	13	510

Table 4

Comparison of Original and Modified
Composite Motor Vehicle CO and NOx Emission Factors
as of December 31, 1987

(Note: All values assume national inputs except as specified)

Region (Altitude)	Pollutant	Temperature (°F)	Speed (mph)	12/31/87 Composite Emission Factor(g/mi) I/M*	Original MOBILE2	Modified	Change(%)
Low	CO	75	19.6	No	27.84	27.57	-1.0%
Low	CO	75	30.0	No	18.41	18.17	-1.3%
Low	CO	25	19.6	No	45.66	43.76	-4.2%
Low	CO	25	30.0	No	30.31	28.98	-4.4%
Low	CO	75	19.6	Yes	21.31	22.02	3.3%
Low	CO	75	30.0	Yes	14.06	14.47	2.9%
Low	CO	25	19.6	Yes	34.23	34.07	-0.5%
Low	CO	25	30.0	Yes	22.69	22.52	-0.7%
High	CO	75	19.6	No	40.66	39.01	-4.1%
High	CO	75	30.0	No	27.49	26.29	-4.4%
High	CO	25	19.6	No	66.27	61.03	-7.9%
High	CO	25	30.0	No	44.82	41.21	-8.1%
High	CO	75	19.6	Yes	33.54	33.68	0.4%
High	CO	75	30.0	Yes	22.67	22.67	0.0%
High	CO	25	19.6	Yes	53.58	51.52	-3.8%
High	CO	25	30.0	Yes	36.26	34.77	-4.1%
Low	NOx	75	19.6	N/A	2.51	2.62	4.4%
Low	NOx	75	30.0	N/A	2.78	2.87	3.2%
Low	NOx	25	19.6	N/A	2.73	2.83	3.7%
Low	NOx	25	30.0	N/A	3.04	3.12	2.6%
High	NOx	75	19.6	N/A	2.30	2.21	-3.9%
High	NOx	75	30.0	N/A	2.55	2.40	-5.9%
High	NOx	25	19.6	N/A	2.48	2.37	-4.4%
High	NOx	25	30.0	N/A	2.77	2.60	-6.1%

* The I/M program assumed consists of 20% stringency factor for pre-1981 vehicles, 50% identification rate for 1981 and later vehicles, no mechanic training, 20 model years inspected, and inspection of light-duty vehicles only beginning on January 1, 1983.

Corrected 9/17/82